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LEEDS & NORTHRUP COMPANY

ELECTRICAL MEASURING INSTRUMENTS
POTENTIOMETER PYROMETERS

ELECTRICAL HEAT TREATING FURNACES
AUTOMATIC CONTROLS

GENERAL OFFICE AND WORKS
4901 STENTON AVE., PHILADELPHIA 44, PA., U. S. A.
CABLE ADDRESS: LEEDSNORTH

March 20, 1953

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[redacted]

Enclosed herewith are our comments concerning the Temperature Test, the Watch Specifications and the Specifications for Adjusting, etc. The watches used for the temperature tests have been returned to the New Haven Clock Company.

Particular attention is called to comments on the temperature tests concerning the friction of the watch movement.

It seems very desirable that approximately six watches be made having the changes as required for the mechanism, that have the polished shafts and the jeweled balance staff mentioned at the meeting with the New Haven Clock Company. Tests on these watches can be made so that it can be determined whether the friction reduction is sufficient or whether the driving torque of the main spring must be increased.

It is obvious that satisfactory results cannot be obtained with the unaltered standard watch.

It is suggested that the tolerance of the watch be changed from -0 to +8 minutes to ± 8 minutes.

[redacted]

We are frankly disturbed that the oil recommended (Elgin N22a) was not used in the temperature tests. It was the only oil that could be found that had the required characteristics. The failure of the Nye, the Gulf and the Micro-Bearing oils could have been predicted without making the tests.

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There is some drawing work to be done which has been held up because no decision has been made concerning the positive starter, cocking device, etc. Since there is a chance that the starter may alter the die casting, everything should be crystallized before the die is made.

We are still awaiting sample mechanisms, etc.

Yours truly,

[redacted]

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25X1, Chief,
Mechanical Division,
Research Department

BJW:lw

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COMMENTS CONCERNING THE WATCH TEMPERATURE TESTS

1. The only oil recommended by us was the Elgin N22a. This was recommended in our letters of October 29th and January 5th. This oil was not used in the tests.

2. The number of watches that did not stop during the test and were within a time tolerance of ± 8 minutes in 24 hours (the present specifications call for -0 to +8 minutes) are:-

Temperature Range	-40 to 160°F	-30 to 140°F	-20 to 140°F
Satisfactory Watches	2	3	3
Percent Satisfactory	17	25	25

The above figures are taken from the two groups of watches considered best in your tests of February 24th, i.e., the six watches with no lubrication and the six lubricated with Myvolube A oil.

These results are most unsatisfactory and reducing the temperature range does not help materially.

3. It is evident that in order to obtain satisfactory results either:-

a. The friction of the movement must be reduced, or

b. The driving torque must be increased by changing the main spring.

The jeweled balance staff and the polished escape wheel and lever shafts were suggested at the meeting at the New Haven Clock Company of October 23rd as a means for reducing the friction. It appears that this change is essential.

The torque of the main spring can be increased without requiring more space by using a Crosscurved Spring made by the:

Sandvik Steel, Inc.,
Sandsteel Spring Division,
145 Hudson Street,
New York 13, New York

This should be called to the attention of the New Haven Company for their consideration.

4. There was no evidence of water having modified the test results.

5. In most of the watches the oil had practically disappeared due probably to evaporation at the high temperatures.

6. The tests were obviously carefully carried out in a commendable manner.

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COMMENTS CONCERNING THE PROPOSED SPECIFICATIONS FOR THE WATCH MOVEMENT

1. The proposed specifications seem to be written for the characteristics normally expected for a watch having a jeweled movement. They may be too severe for the unjeweled inexpensive movement contemplated here.

2. For instance paragraphs A4, A6 and B4 concerning the friction of the movement, are conditions that would be ordinarily expected in a jeweled watch but may be impossible to meet in an unjeweled movement.

3. If the watch manufacturer accepts and meets these requirements, well and good. They are certainly desirable if it is possible to meet them.

4. It was agreed and recorded in the minutes of the meeting held at the New Haven Clock Company, October 23, 1952, that the balance staff would be jeweled. Paragraph C5 should be changed accordingly.

5. It is questionable as to what is meant in paragraph A3. If 300 cycles per second is meant for the test vibration frequency, it is far too high by a factor of ten, i.e. 30 cycles per second would be reasonable.

6. Due to typographical errors paragraphs B9 and C7 are not understandable.

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COMMENTS CONCERNING TENTATIVE SPECIFICATIONS FOR ASSEMBLY, ADJUSTING AND TESTING MECHANICAL TIME DELAY MECHANISM

Page 1 - 5th paragraph from the bottom - change Elgin Oil M56b to Elgin Oil M22a.

Page 3 - Item IV, 3rd paragraph, delete "on a taper" and insert "against a shoulder"

Page 3 - Item VI delete "rubber" and insert "neoprene".

Page 3 - Item IV add the following to the end of the second paragraph. "When setting the disc by hand, the final motion of the disc should be in the direction that it is driven by the watch (clockwise)."

Insert after IV as V the following:

V. "Check the mechanism and the minute hand setting by taking a short run allowing the striker to stop an electric clock by means of a switch. The delay set on the mechanism should check the actual delay as given by an electric clock within ± 1 minute at 15 minutes. The final setting of the disc should be in the direction that the watch moves it. (clockwise)."

Insert after V the following:

VI. "Any mechanism that fails to operate properly on any test shall be rejected and it shall not be accepted until the cause has been positively located and corrected. The fact that the mechanism works satisfactorily on a repeat test is no proof that the fault has been corrected. If the fault is in the clockwork, it shall be returned to the clock manufacturer for cleaning and adjustment. If the fault is in the trip mechanism, the parts shall be disassembled."

Change V to VII and VI to VIII.

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